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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/903,721	07/12/2001	Patrick J. Bohrer	AUS920010132US1 (9000/29)	9310
7590	02/03/2005			EXAMINER CHERY, MARDOCHEE
Frank C. Nicholas CARDINAL LAW GROUP Suite 2000 1603 Orrington Avenue Evanston, IL 60201			ART UNIT 2188	PAPER NUMBER
DATE MAILED: 02/03/2005				

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/903,721	BOHRER ET AL.	
	Examiner	Art Unit	
	Mardochee Chery	2188	

— The MAILING DATE of this communication appears on the cover sheet with the correspondence address —
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) Responsive to communication(s) filed on 01 December 2004 (Amendment).
 2a) This action is FINAL. 2b) This action is non-final.
 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) Claim(s) 1-25 is/are pending in the application.
 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
 5) Claim(s) _____ is/are allowed.
 6) Claim(s) 1-25 is/are rejected.
 7) Claim(s) _____ is/are objected to.
 8) Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) The specification is objected to by the Examiner.
 10) The drawing(s) filed on 12 July 2001 is/are: a) accepted or b) objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 a) All b) Some * c) None of:
 1. Certified copies of the priority documents have been received.
 2. Certified copies of the priority documents have been received in Application No. _____.
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Amendment

1. This Office Action is in response to applicant's communication filed on December 1, 2004 in response to PTO Office Action mailed on November 3, 2004. The applicant's remarks and amendments to the claims and/or the specification were considered with the results that follow.
2. In the remarks, page 5, lines 1-2, Applicant mentions the addition of claims 22-26, but it appears that he meant to say claims 22-25 as shown on page 15 of the amendment.
3. The newly added limitations introduced into dependent claims 2 and 5, do not affect the scope of the rejection because the recitation that "if at least one first tier disk does not have adequate space" and "one or more of the disks" do not remove the references from reading upon the claims because the system recited in Craig determines if there is adequate space as disclosed in col.18, lines 1-2.
4. Claims 1-21 have been presented for examination in this application. In response to the last Office Action, claims 2, 5, and 21 have been amended. Claims 22-25 have been added. As a result, claims 1-25 are now pending in this application.

5. The objection to the specification has been withdrawn due to the amendment filed on December 1, 2004.

6. The objection to claim 21 has been withdrawn due to the amendment filed on December 1, 2004.

7. The rejection of claims 9-10, 19-20 under 112 first paragraph has been withdrawn due to amendment filed on December 1, 2004.

8. The rejection of claims 2, 5, 12, and 15 under 112 second paragraph, as well as the rejection of claims 3-4, and 13-14, which depend on claims 2 and 12 respectively, have been withdrawn due to amendment filed on December 1, 2004.

9. The rejection of claims 1, 3, 6-7, 9-12, 13, 16-17, and 19-21, as in the Office Action mailed on November 3, 2004, is respectfully maintained and reiterated below for applicant's convenience.

R sponse to Arguments

10. Applicant's arguments filed on December 1, 2004 have been fully considered but they are not persuasive.

a. Regarding Applicant's argument on page 13, lines 4-5, that "the references fail to show certain features of applicant's invention", it is noted that the features upon which applicant relies (i.e., the plurality of disk is a RAID system) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

b. During the interview dated November 23, 2004, Applicant has agreed to amend the claims to include that "the plurality of disks are RAID disks" to overcome the prior art. However, Examiner notices that this amendment was not made as agreed in the interview. Independent claims 1, 11, and 21, do not disclose the use of RAID as the plurality of disks. Examiner suggests that Applicant amend the claims to include that the plurality of disks is a RAID system to more clearly point out the subject matter which he sees as his invention.

c. Regarding Applicant's argument on page 13, line 13, that "Craig's reference is nonanalogous art", it has been held that the determination that a

reference is from a nonanalogous art is twofold. First, we decide if the reference is within the field of the inventor's endeavor. If it is not, we proceed to determine whether the reference is reasonably pertinent to the particular problem with which the inventor was involved. *In re Wood*, 202 USPQ 171,174. In this case, Craig's reference teaches error removal or fault tolerance can be provided by redundant array of inexpensive disks (RAID) containing redundant data (col.15, lines 64-66]. Thus, Craig's reference is from the same field of the inventor's endeavor.

d. Regarding Applicant's argument on page 13, line 13, that "Craig does not teach the claimed elements", "providing a first tier of at least one disk, the first tier storing at least one popular unit and providing a second tier of at least one disk, the second tier storing at least one unpopular unit".

Examiner respectfully traverses applicant's arguments for the following reasons. Examiner would like to point out that the data storage device may include both optical and magnetic memories (i.e., disks) and removing the aged data from storage units 278, 282 and 286 and places it in storage 290 guarantees that at least one popular unit is stored on storage units 278, 282, and 286, and at least one unpopular unit is stored on storage unit 290; (*Fig. 3B; col.9, lines 36-39*); and has the same effect as Bohrer's disclosure.

Claim Rejections - 35 USC § 103

11. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

12. Claims 1-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nunnelley-Lewis, U.S. Patent 5,900,007, in view of Craig-Bernard, U.S Patent 5,790,176.

As per claim 1, Nunnelley-Lewis discloses a method of operating a plurality of disks having units of storage allocation, [the system includes a large number of small files, and storage management subsystems "(storage managers)" for controlling power status of the disk files and the allocation of data to the disk files; col.2, lines 22-25]; powering on at least one first tier disk [The allocation manager passes the cluster list to the power manager, whose function is to make the clusters active so that the dataset can be stored. The power manager determines which physical disk files must be active to fulfill the storage request by referring to cluster map 114; col. 4, lines 19-23; clusters may be placed in an active mode when one or more of the storage managers determines that their use may be required; col.2, lines 37-39]; powering down the second tier [The storage managers minimize internal thermal loading and power consumption for the disk array by placing clusters in an inactive mode when not in use; col.2, lines 34-36]; determining whether a request for a unit

requires processing on the first tier or second tier [One storage manager, known as an allocation manager, chooses the clusters upon which incoming data is written based on the current state of each cluster "(active or inactive)"; col.2, lines 39-42; power manager 106 determines which disk files must be activated to fulfill the request; col. 4, lines 43-45]; accessing the requested unit if the requested unit requires processing on the first tier [a third storage manager, known as an access manager, interprets incoming read requests, determines the cluster location of the stored data; col.2, lines 44-47; power manager 106 determines which disk files must be activated to fulfill the request; col. 4, lines 43-45]; powering on a second tier disk [The storage managers minimize internal thermal loading and power consumption for the disk array by placing clusters in an inactive mode when not in use; col.2, lines 34-36] to copy the requested unit from the second tier disk to a first tier disk, if the requested unit is stored on the second tier [such that at any point in time some disk files are active and others are inactive , and further such that the disk files which are active are those determined to be the best suited to serving the read and write storage requests pending in the system; col.3, lines 48-52].

However, Nunnelley does not teach providing a first tier of at least one disk, the first-tier storing at least one popular unit.

Craig-Bernard discloses once a feature is aged to a point of not having been requested within a predetermined time period, the Media Server removes the program from on-line storage units 278, 282 and 286 and places it in an archival storage 290 [Since Craig discloses the data storage device may include both optical and magnetic memories; removing the aged data from storage units 278, 282 and 286 and places it in an archival storage 290

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guarantees that at least one popular unit is stored on storage units 278, 282, and 286 and therefore has the same effect as Bohrer's disclosure; Fig. 3B; col.9, lines 36-39].

As taught by Craig, removing the program from on-line storage units 278, 282 and 286 and places it in an archival storage 290 has the advantages of maximizing system resources while providing acceptable access time to the feature based on its demand history (col.9, lines 34-36).

Nunnelley does not teach providing a second tier of at least one disk, the second tier storing at least one unpopular unit.

By the system of Craig, since aged data are removed from storage units 278, 282 and 286 and placed in an archival storage 290, it is evident that archival storage 290 must have at least one aged data (unpopular unit).

It would have been obvious to one of ordinary skill in the art at the time the invention was made by applicant to utilize the teaching of Craig in the system of Nunnelley for the aforementioned advantages.

Accordingly, one of ordinary skill in the art would have recognized this and concluded that they are from the same field of endeavor. This would have motivated one of ordinary skill in the art to implement the above combination for the advantages set forth above.

As per claim 11, Applicant's attention is directed to the rejection of claim 1 supra.

As per claim 21, Nunnelley-Lewis discloses a system for operating a plurality of disks having units of storage allocation, [the system includes a large number of small files, and storage management subsystems "(storage managers)" for controlling power status of the disk files and the allocation of data to the disk files; col.2, lines 22-25]; means for powering on at least one first tier disk [The allocation manager passes the cluster list to the power manager, whose function is to make the clusters active so that the dataset can be stored. The power manager determines which physical disk files must be active to fulfill the storage request by referring to cluster map 114; col. 4, lines 19-23; clusters may be placed in an active mode when one or more of the storage managers determines that their use may be required; col.2, lines 37-39]; means for powering down the second tier [The storage managers minimize internal thermal loading and power consumption for the disk array by placing clusters in an inactive mode when not in use; col.2, lines 34-36]; means for determining whether a request for a unit requires processing on the first tier or second tier [One storage manager, known as an allocation manager, chooses the clusters upon which incoming data is written based on the current state of each cluster "(active or inactive)"; col.2, lines 39-42; power manager 106 determines which disk files must be activated to fulfill the request; col. 4, lines 43-45]; means for accessing the requested unit if the requested unit requires processing on the first tier [a third storage manager, known as an access manager, interprets incoming read requests, determines the cluster location of the stored data; col.2, lines 44-47; power manager 106 determines which disk files must be activated to fulfill the request; col. 4, lines 43-45]; means for powering on a second tier disk [The storage managers minimize internal thermal loading and power consumption for the disk array by placing clusters in an inactive mode when not in use; col.2, lines 34-36] to copy the requested unit from the second tier disk to a first tier disk, if the requested unit is stored on the second tier [such that at any point in time some disk files are active and others are

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inactive , and further such that the disk files which are active are those determined to be the best suited to serving the read and write storage requests pending in the system; col.3, lines 48-52].

However, Nunnelley does not teach means for providing a first tier of at least one disk, the first tier storing at least one popular unit as recited in the claim.

Craig-Bernard discloses once a feature is aged to a point of not having been requested within a predetermined time period, the Media Server removes the program from on-line storage units 278, 282 and 286 and places it in an archival storage 290 [Since Craig discloses the data storage device may include both optical and magnetic memories; removing the aged data from storage units 278, 282 and 286 and places it in an archival storage 290 guarantees that at least one popular unit is stored on storage units 278, 282, and 286 and therefore has the same effect as Bohrer's disclosure; Fig. 3B; col.9, lines 36-39].

As taught by Craig, removing the program from on-line storage units 278, 282 and 286 and places it in an archival storage 290 has the advantages of maximizing system resources while providing acceptable access time to the feature based on its demand history (col.9, lines 34-36).

Nunnelley does not teach means for providing a second tier of at least one disk, the second tier storing at least one unpopular unit.

By the system of Craig, since aged data are removed from storage units 278, 282 and 286 and placed in an archival storage 290, it is evident that archival storage 290 must have at least one aged data (unpopular unit).



It would have been obvious to one of ordinary skill in the art at the time the invention was made by applicant to utilize the teaching of Craig in the system of Nunnelley for the aforementioned advantages.

Accordingly, one of ordinary skill in the art would have recognized this and concluded that they are from the same field of endeavor. This would have motivated one of ordinary skill in the art to implement the above combination for the advantages set forth above.

As per claims 2, 12 and 22-23, Nunnelley discloses the claimed invention as detailed above in the previous paragraphs. However, Nunnelley does not teach determining if at least one first tier disk has adequate space to process a requested unit; copying the requested unit from the second tier disk to the first tier disk if at least one first tier disk has adequate space; creating the requested unit on the first tier; and generating adequate space on the first tier as recited in the claims.

Craig discloses determining if at least one first tier disk has adequate space to process a requested unit [*if they are capable of storing the entirety of the program in a single memory device such as 521; Fig.5; col.18, lines1-2*]; copying the requested unit from the second tier disk to the first tier disk if at least one first tier disk has adequate space [*the content of the third type of memory device represented by 521...52N, can be fed directly into corresponding memory devices of the fourth type; Fig.5; col.17, lines 65-67*]; creating the requested unit on the first tier [Fig.5]; generating adequate space on the first tier [*if they*

are capable of storing the entirety of the program in a single memory device such as 521; Fig.5; col.18, lines 1-2] for storing program data (col.4, lines 57-58).

Since the technology for determining and generating adequate space in a storage device was well known as evident by Craig, and since determining and generating adequate space stores the program data, an artisan would have been motivated to implement this feature in the system of Nunnelley. Thus, it would have been obvious to one of ordinary skill in the art at the time the invention was made by applicant, to modify the system of Nunnelley to include determining and generating adequate space on the disk because it was well known for storing program data (col.4, lines 57-58) as taught by Craig.

As per claims 3 and 13, Nunnelley discloses the claimed invention as detailed above in the previous paragraphs. However, Nunnelley does not specifically teach determining if a first tier unit has become unpopular and transferring the unpopular first tier unit to a second tier disk as recited in the claims.

Craig discloses determining if a first tier unit has become unpopular [*Feature Index System 252 performs catalog maintenance functions including input of new feature program data into the system, ageing, and deletion or archival of aged program data; Feature Index System 252 keeps track of the access frequency of the stored data; col.9, lines 11-15*]; transferring the unpopular first tier unit to a second tier disk [*Once a feature is aged to a point of not having been requested within a predetermined time period, the Media Server removes the program from on-line storage units 278, 282, and 286 and places it in archival storage 290; col.9, lines 36-39*] to designate frequently used features (col.5, lines 66-67).

Since the technology for determining if a first tier unit has become unpopular and transferring the unpopular first tier unit to a second tier disk was well known as evidenced by Craig, and since determining if a first tier unit has become unpopular and transferring the unpopular first tier unit to a second tier disk designate frequently used features, an artisan would have been motivated to implement this feature in the system of Nunnelley. Thus it would have been obvious to one of ordinary skill in the art, at the time the invention was made by applicant, to modify the system of Nunnelley to include determining if a first tier unit has become unpopular and transferring the unpopular first tier unit to a second tier disk because it was well known to designate frequently used features (col.5, lines 66-67) as taught by Craig.

As per claims 4 and 14, Nunnelley discloses the claimed invention as detailed above in the previous paragraphs. However, Nunnelley does not specifically teach determining if the unpopular unit has been modified, and transferring only modified unpopular first tier units to the second tier as recited in the claims.

Craig discloses determining if the unpopular unit has been modified, and transferring only modified unpopular first tier units to the second tier [*once a feature is aged to a point of not having been requested within a predetermined time period, the Media Server removes the program from on-line storage units 278,282 and 286 and places it in archival storage 290; Fig.5; col.9, lines 36-39; since the second tier disk has already stored the unpopular units from the first tier,*

it is obvious to transfer the unpopular first tier unit to the second tier only if it has been modified] to designate frequently used features (col.5, lines 66-67).

Since the technology for determining if the unpopular unit has been modified, and transferring only modified unpopular first tier units to the second tier was well known as evidenced by Craig, and since determining if the unpopular unit has been modified, and transferring only modified unpopular first tier units to the second tier designate frequently used features, an artisan would have been motivated to implement this feature in the system of Nunnelley. Thus it would have been obvious to one of ordinary skill in the art, at the time the invention was made by applicant, to modify the system of Nunnelley to include determining if the unpopular unit has been modified, and transferring only modified unpopular first tier units to the second tier because it was well known to designate frequently used features (col.5, lines 66-67) as taught by Craig.

As per claims 5 and 15, Craig discloses assigning a portion of the disks to the first tier [*portions of a single program contained in the first type of memory device, such as 501 are distributed over a plurality of different memory devices 511, 512, 513...51N of a second memory type; col.17, lines 20-23; the fact that portions of a program can be contained in the first type of memory device serves the purpose of assigning a portion of the disk to the file and therefore to the first tier*].

As per claims 6 and 16, Craig-Bernard discloses the first tier disks comprising high-performance hard drives [*a memory array constituted by a plurality of memory types, each memory type having a different operating speed, said memory array comprising a plurality of memory devices of each said memory type, said plurality of memory types being arranged from a first to n'th level*

according to increasing operating speed; although the plurality of memory types may include DRAM, Magnetic Disk, high speed magnetic tape, and archival magnetic tape it would have been obvious to replace any of those media with the disks of Bohrer et al. since disks are now inexpensive and they have the capabilities for both reading and writing; col.21, lines 32-37].

As per claims 7 and 17, Craig-Bernard discloses the second tier disks comprise low-power hard drives [*said plurality of memory types being arranged from a first to n'th level according to increasing operating speed; although the plurality of memory types may include DRAM, Magnetic Disk, high speed magnetic tape, and archival magnetic tape it would have been obvious to replace any of those media with a magnetic disk since magnetic disks are now inexpensive and they have the capabilities for both reading and writing; col.21, lines 32-37].*

As per claims 8 and 18, Craig discloses the unit comprises at least one member selected from a group consisting of: a file, a portion of a file, a file system block, a combination of files, and a suitable subdivision of information [*the resulting data stream is constituted using a data striping method in which portions of a single program contained in the first type memory device, such as 501, are distributed over a plurality of different memory devices 511,512,513...51N of a second memory type; col.17, lines 19-24].*

As per claims 9 and 19, Craig discloses the popular unit comprises a unit *meeting or exceeding a condition limit, and the unpopular unit comprises a unit not meeting the condition limit [Usage Probability Processor 262 statistically determines features having the highest probability of usage on a per hour and day of week basis to properly allocate high order storage; col.10, lines 21-24].*

As per claims 10 and 20, Craig discloses the condition limit is determined based on usage factors [Usage Probability Processor 262 assigns a priority value to the feature which is used to determine the appropriate storage type to maximize system resources while providing acceptable access time to the feature based on its demand history; col.9, lines 32-36].

As per claims 24-25, Applicant's attention is directed to the rejection of claim 1 supra. Nunelley et al. further discloses a RAID system [*clusters are organized as RAID arrays*; col.2, lines 31-32].

Conclusion

13. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

14. When responding to the office action, Applicant is advised to clearly point out the patentable novelty that he or she thinks the claims present in view of the state of the art disclosed by references cited or the objections made. He or she must also show how the amendments avoid such references or objections. See 37 C.F.R. 1.111(c).

15. When responding to the office action, Applicants are advised to provide the examiner with the line numbers and page numbers in the application and/or references cited to assist the examiner to locate the appropriate paragraphs.

16. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mardochee Chery whose telephone number is (571)272-4246. The examiner can normally be reached on 8:30A-5:00P.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Manonama Padmanabhan can be reached on (571)272-4210. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Monday January 24, 2005

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